

with the disclosure in the specification at, for example, page 1, lines 22-24 ("at least one" selected from a protein, a polysaccharide, etc.) and the Examples in the specification which show polymeric matrices comprising both proteins and polysaccharides (see, e.g., Example 1 on page 8). New claim 108 has been added more completely to define the subject matter which Applicants regard as their invention. The recitation that the surface active agent comprises gelatin draws support, for example, from the specification at page 2, line 3.

Claim 53 has also been amended to delete the expression ("in respective amounts") to which the Examiner objects on page 5 of the Official Action. Claim 75 has been amended to make clear the standard with respect to which the recitation "slower" refers whereby to remove the basis for objection to this term. With respect to the rejection of claim 104 based on the recitation "A dispersion", this rejection is respectfully not understood. The term uses the indefinite article "A" and needs no antecedent basis. This rejection is accordingly traversed. All claims as amended are respectfully believed to be sufficiently definite to satisfy the dictates of 35 USC 112, second paragraph.

The claims stand rejected under 35 USC 103(a) as allegedly being unpatentable over Connick and Nitto Electric Ind Co. in view of Meinke et al. Applicants respectfully traverse these rejections.

The claimed invention is drawn to water insoluble beads composed of two

types of biopolymers, a protein and a polysaccharide, comprising a volatile material, e.g., a pheromone, wherein **the beads are constructed such that the pheromone is released into the atmosphere by evaporation** (the pheromone is a liquid oil). To achieve this, it is critical that the beads, which prior to a desired release of the volatile material are dispersed in water, be such that they release the pheromone into the atmosphere only **after they are dried**. Accordingly, all of the claims presently on file require that the beads be storable in water without release of the recited volatile hydrophobic component and that the volatile component only be released from the water insoluble beads in atmospheric air. Obviously, if there were a release of the bioactive material already from the dispersion of the beads in water, the release effect would be obtained in a container, prior to its application, thus making the composition unsuitable for a desired release of the volatile material (pheromone) into the atmosphere.

The Examiner has apparently not considered the recitations in claim 53 pertaining to the release characteristics of the claimed composition in atmospheric air because the Examiner considers these recitations to be directed to an "intended use" of the claimed composition (see Official Action at last paragraph on page 8). This is, however, respectfully submitted to be incorrect. The subject recitations functionally limit the claimed components to those that are capable of achieving the particular release characteristics. This is a proper restriction of the composition, as recognized in MPEP Section 2173.05(g) ("A functional limitation is often used in association with an element, ingredient or step of a process to define a particular capability or

purpose that is served by the recited element, ingredient or step."). See, also, *In re Barr*, 170 USPQ 33 (CCPA 1971)(recognizing the limiting effect on a chemical compound of the recitation "incapable of forming a dye with said oxidizing developing agent").

Since Connick teaches away from the claimed recitations relating to the atmospheric release characteristics of the claimed water insoluble beads, it is respectfully submitted that the reference cannot provide the motivation required to modify the reference to arrive at the claimed invention as maintained by the Examiner at page 3 of the Official Action. Indeed, as discussed in MPEP Section 2143.03, a prior art reference cannot be modified to render it unsatisfactory for its intended purpose (release in aqueous medium) or to change its principle of operation (release in aqueous medium). Accordingly, it is respectfully submitted that Connick cannot be properly combined with the other cited references to arrive at the claimed invention.

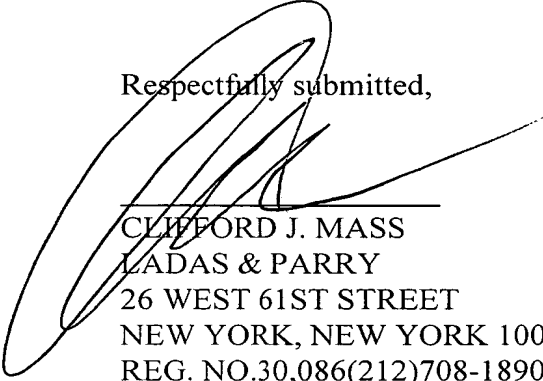
In the absence of any motivation to modify Connick to arrive at the claimed invention, it is respectfully submitted that the cited art cannot set forth even a *prima facie* case of obviousness for the invention as claimed. Neither of the secondary references shows or suggests beads having the claimed composition and neither provides any motivation to modify the Connick reference which, as discussed, teaches away from water insoluble beads. In the absence of a proper motivation to combine the references, the references do not set forth even a *prima facie* case of obviousness for the invention as claimed in any of the claims of record (see MPEP Section

2143.03).

With specific respect to claim 108, the claimed bead uses gelatin or other proteins as both the surface active agent and as part of the polymeric matrix. This has a great advantage over conventional surfactants which are used to stabilize emulsions, and function only by adsorbing up to a monolayer on the oil droplets. Here, the protein may be both adsorbed on the oil droplets (thus functioning as a surface active agent), but the majority of the protein may be out of the droplets' surface, as part of the polymeric matrix. This combination of protein and polysaccharide, and the use of a protein having a dual effect is *a fortiori* patentable over the cited art.

In view of the above, all rejections and objections of record are respectfully believed to have been overcome and the application is believed to be in allowable form. An early notice of allowance is earnestly solicited and is believed to be fully warranted.

Respectfully submitted,



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Claim 53 (amended) A water insoluble bead comprising droplets of an oil in water emulsion in a polymer matrix, wherein said polymer matrix comprises a protein and a polysaccharide and the oil in water emulsion [comprising] comprises at least one volatile hydrophobic component, a surface active agent and water, the volatile hydrophobic component, surface active agent and polymer matrix being selected and being present in the bead [in respective amounts] such that the bead is storable in water without release of the volatile component and such that the volatile component is released from said water insoluble bead in atmospheric air.

Claim 55 (amended) The water insoluble bead according to claim 53 [54], wherein said protein is selected from the group consisting of gelatin, albumin, casein and lactoglobulin.

Claim 56 (amended) The water insoluble bead according to claim 53, wherein [said polymer matrix comprises a] the polysaccharide is selected from the group consisting of sodium alginate, carraggenan, guar gum, locus bean gum, chitosan, pectin and carboxy methyl cellulose.

Claim 72 (amended) The water insoluble bead according to claim 53 [54], wherein said protein is a gelatin.

Claim 75 (amended) The water insoluble bead according to claim 53, further comprising tannic acid in an amount effective to provide a release rate of the volatile component from said bead in atmospheric air that is slower than a release rate of the volatile component from the bead in atmospheric air without the tannic acid.

Claim 76 (amended) A process for preparing a sustained-release dispersion of a plurality of water insoluble beads according to claim 53 for release of [a] the volatile hydrophobic component therefrom in atmospheric air, comprising:

- a) preparing an oil/water emulsion by homogenizing [a] the volatile hydrophobic component in water, using at least one surface active molecule;
- b) mixing said emulsion with at least one water-soluble polymer and optionally rehomogenizing the mixture;
- c) adding the emulsion prepared in step (b) in a dropwise manner into a gellant solution to form said water insoluble beads;
- d) recovering the water insoluble beads from the gellant solution; and
- e) storing the recovered beads in water.